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SAN FRANCISCO BAY AREA IN-DEPTH STUDY

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REVISED PLAN OF STUDY

JANUARY 1975



U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO
CORPS OF ENGINEERS
SAN FRANCISCO, CALIFORNIA

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REVISED PLAN OF STUDY
SAN FRANCISCO BAY AREA
IN-DEPTH STUDY

ERRATA

Due to a reduction in the funding level for the FY 1976 program from \$150,000 to \$100,000, the following changes in the Milestone Schedule on page 32 should be made.

<u>Milestone</u>	<u>Current</u>	<u>Revised</u>
02	28 Feb 1975	28 Feb 1975
03	14 Mar 1975	1 May 1975
04	Dec 1975	Apr 1976
05	Feb 1976	Jul 1976
06	Mar 1977	Jul 1977
07	Aug 1977	Dec 1977
08	Sep 1977	Jan 1978
09	Feb 1978	Jun 1978
10	Jun 1978	Sep 1978
11	Jul 1978	Oct 1978

Ports	San Francisco bay area
Shipping	"
Waterways	"
Water development	"
Conservation - Water	
City planning Waterfront	

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2	STUDY COST ESTIMATE (PB-6)

PLATES

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1	SAN FRANCISCO BAY REGION
2	TRANSPORTATION SYSTEMS REGION
3	SAN FRANCISCO BAY REGION AND CENTRAL VALLEY



DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
100 McALLISTER STREET
SAN FRANCISCO, CALIFORNIA 94102

SPNED-N

January 1975

SUBJECT: Revised Plan of Study, San Francisco Bay Area In-Depth Study

THRU: Division Engineer
U.S. Army Engineer Division, South Pacific
San Francisco, California 94102

TO: Chief of Engineers
Department of the Army
Washington, D.C. 20315

1. AUTHORIZING LEGISLATION

The San Francisco Bay Area In-Depth Study was authorized pursuant to a resolution adopted by the Committee on Public Works, House of Representatives, on 19 October 1967, (Navigation Docket No. 1635). The Resolution reads as follows:

RESOLUTION

"Resolved by the Committee on Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports on San Francisco Bay and all tributary deep water ports, as contained in two resolutions adopted by the Committee on Public Works of the House and Senate (Resolutions authorizing Comprehensive Bay Survey and San Francisco-Sacramento-San Joaquin Delta Study); and Reports published in House and Senate Documents (San Francisco Harbor, Redwood City, Lower San Francisco Bay, Oakland Harbor, Richmond Harbor, San Pablo Bay and Mare Island Strait, Sacramento Deep Water Channel, Suisun Bay, San Joaquin River, Stockton Channel).

The investigation is to be undertaken with the object of promoting and encouraging the efficient, economic, and logical development of the harbor complex and its hinterland. The scope will encompass investigation of current shipping problems, adequacy of facilities, delays in intermodal transfers, channel dimensions, storage locations, and capacities, and other physical aspects affecting Golden Gate waterborne commerce.

The investigation shall include, but not be limited to, the impact of waterborne commerce in the Golden Gate region on the local, national and international economies, and its relation thereto; research into current and future markets for the import and export commerce of the region; evaluation of regional Pacific Coast integrated approaches toward the opportunities and problems engendered thereby; an inventory of regional shipping facilities, capacity, and operating entities and an evaluation thereof; a study of industrial and trade trends owing to new and improved technological advances, methods, improved vessel design, cargo handling facilities, extension of automation, and other cargo, vessel and operating concepts; relationship of waterborne shipping to other modes of transportation with particular reference to intermodal transfer and facilitation of through-shipments: comparison of the status and future of Bay Region ports and terminals with other national and international harbor complexes; recommendations for types, sizes and locations of future facilities, and improvements and expansions of existing facilities, including deep-draft navigation channels; recommendations for improvements in harbor and industrial operations and development through improved coordination and programming, including solicitation, market research, public relations, advertising and long-term planning; determination of the adequacy of the region's shipping capacity in terms of its role in the defense mobilization base, and citing any inadequacies therein; the role and functions of the harbor complex in Pacific Basin development; presentation of guidelines for regional development to the extent required by navigational uses and potentials; contributions possible on balance-of-payments through expanded commerce and more efficient harbor operations: determination of bulk movement projections, including estimated raw material requirements of the regional and national economy possible of shipment through the Golden Gate, with particular reference to economies afforded by use of super-sized bulk transport vessels and tankers; advantages afforded to the Government by waterborne commerce's contributions of increased tax revenues and improvements in balance-of-payments; effects on the regional and national economy of new and expanded heavy industry and ancillary industry and ancillary industries dependent thereon as a result of

improved navigation and more efficient harbor operations; and desirability and extent of Federal participation in securing adequate bases for expansions and improvement of shipping facilities and further integration of regional planning for waterborne commerce."

The Resolution was sponsored by Congressmen Don H. Clausen, Jerome R. Waldie and Harold T. Johnson.

2. BACKGROUND

The Detailed Plan of Study for the San Francisco Bay Area In-Depth Study was prepared and transmitted on 8 March 1971. Congressional approval for the study to proceed was received in September 1971.

3. The objectives of the study were to prepare guidelines for alternative regional plans to accommodate waterborne commerce in the San Francisco Bay Region within the context of needs for environmental protection and enhancement and general community well-being. The output of the comprehensive investigations contemplated in the study was to be a series of navigation development alternatives for different levels of commerce, together with their physical, financial, environmental, and social implications. The array of alternatives was to range from those favorable to the environment and social well-being to those favorable to economic development of the Bay Region.

4. To accomplish the study objectives, the scope of study included six major study analyses which would provide the necessary inputs for the main report. These study analyses were: Commodity Flow; Vessels and Port Facilities; Transportation Systems; Environmental; Social Well-Being; and, National Defense. The study was to encompass a multi-agency effort utilizing the multi-disciplinary expertise of various Federal and non-Federal agencies. The selection and evaluation of alternative port systems was to be implemented within the framework of the component needs of the national economic development objective, the regional environmental objective and the regional social well-being objective. The study time horizon was to consist of a short-term period (1980-1985), medium-term period (1995-2005) and a long-term period (2020-2040).

5. The study was estimated to cost \$4.5 million, spread over five fiscal years, FY 1972 through FY 1976. Of the total, \$2.05 million were allocated to the Corps of Engineers and \$2.45 million to other participating Federal agencies. As scheduled, major study efforts were to be conducted over the three-year period, FY 1973 through FY 1975 with required funding in excess of \$1 million for each of these years.

6. However, study funding has not kept pace with fund requirements to accomplish the stated objective of the Detailed Plan of Study within the five-year study period. When the FY 1974 budget was decreased to \$80,000, the three previously funded agencies, Maritime Administration, Coast Guard and EPA, were notified that continuing funding to them would not be possible and henceforth, the In-Depth Study, by necessity, would become a Corps of Engineers in-house study. Table 1 shows actual funding and fund allocations among active Federal participants to date.

TABLE 1

ACTUAL APPROPRIATION AND FUND ALLOCATIONS
AMONG FEDERAL PARTICIPANTS

Fiscal Year	Total Appropriation (\$1,000)	Allocation Among Federal Participants (\$1,000)			
		Corps	MARAD	EPA	Coast Guard
Prior Years	140	140 ^{1/}	0	0	0
1971	90	90	0	0	0
1972	200	170	10	10	10
1973	115	80	9	9	17
1974	80	80	0	0	0
1975	<u>75</u>	<u>75</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL	700	635	19	19	27

^{1/} Used by Corps of Engineers for preparation of Preliminary Plan of Study and Detailed Plan of Study.

7. It is the funding restriction and recent changing events relating to regional navigation planning at the State and local levels that led to the conclusion that the Detailed Plan of Study must be revised to reflect reduced funding levels and to meet current local planning needs.

8. The following pages will present accomplishments to date of the In-Depth Study, current State and local planning efforts directly influencing the Study, and the Revised Plan of Study.

9. ACCOMPLISHMENTS TO DATE

Upon Congressional approval of the Detailed Plan of Study in September 1971, extensive coordination efforts were carried out to organize the Federal interagency participants into task groups to conduct the various study analyses. The Maritime Administration, Coast Guard and Environmental Protection Agency agreed to chair the Vessels and Port Facilities Analysis, Transportation Systems

Analysis, and Environmental Analysis, respectively. These three Federal agencies were funded by the Corps beginning in FY 1972 as indicated in Table 1. The Corps retained chairmanship in the Commodity Flow Analysis, Social Well-Being Analysis and the Main Report. Responsibility for the National Defense Analysis was not assigned. Extensive coordination was conducted also with 15 other Federal agencies which had indicated willingness to participate in the various study analyses with the expectation that funding would be available to them in the subsequent fiscal years. Study accomplishments to date are summarized as follows:

a. Commodity Flow Analysis:

- (1) Organized Economic Advisory Group.
- (2) Working Draft, Plan of Analysis, March 1972.
- (3) Draft Report, Literature and Data Review, June 1972.
- (4) Draft Report, Future Waterborne Commerce, June 1972.
- (5) Final Report, Pilot Study for Pacific Basin Trade Model, December 1972.
- (6) Final Report, Historical Commodity Movement, June 1973.

b. Vessels and Port Facilities Analysis:

- (1) Organized Vessel and Port Facilities Advisory Group.
- (2) Draft Report, Plan of Analysis, December 1972.
- (3) Draft Report, Merchant Fleet Data, January 1973.
- (4) Final Report, Channels, Ports and Related Facilities Inventory, June 1973.

c. Transportation Systems Analysis:

- (1) Organized Transportation Systems Advisory Group.
- (2) Working Draft, Plan of Analysis, September 1972.
- (3) Working Draft, Transportation Regions, September 1973.

d. Environmental Analysis:

- (1) Organized Environmental Advisory Group.
- (2) Working Draft, Plan of Analysis, June 1972.

(3) Draft Report, Preliminary Environmental Objectives, June 1972.

e. Social Well-Being Analysis:

(1) Organized Social Well-Being Advisory Group.

(2) Draft Report, Framework for Analysis, June 1972.

(3) Draft Report, Preliminary Economic Base Projections, September 1972.

10. Another major study effort was the formation and operation of a high level study Advisory Committee. This Committee of 38 members consists of seven members from Federal agencies, four members from State agencies, six members from regional agencies, and twenty-one members from local organizations. Local representation includes members from shipping, finance, labor, industry, conservation groups and ports. The work of the Committee is intended to stimulate public understanding of marine transportation trends affecting the Bay Region, and to suggest alternative navigation systems which would serve as a cooperative basis for formulating local, regional, State and national objectives. Committee membership is shown on Table 2.

11. The committee met initially on 9 March and thereafter on 15 June 1972 and 12 October 1972. The next scheduled meeting in January 1973 was cancelled and the Committee suspended in accordance with provisions of the Federal Advisory Committee Act. At about the same time, the In-Depth Study effort was diverted to the West Coast Deepwater Port Facilities Study. Therefore, this committee has not met since October 1972 although recent instructions from the Office, Chief of Engineers, indicated that this type of committee is considered operational in nature and, therefore, exempt from the Act. Because of reduced study funding, it is anticipated that this committee will not meet as frequently as originally intended. However, important study issues and findings, such as the Revised Plan of Study, will be forwarded to the committee for review.

12. RECENT EVENTS AFFECTING THE IN-DEPTH STUDY

There are several recent planning developments on the State and local levels which bear directly on the In-Depth Study. These events include the enactments of State laws calling for regional navigation planning: a new policy of the San Francisco Bay Conservation and Development Commission (BCDC) which stated that future port development proposals requiring Commission approval must be guided by

TABLE 2
SAN FRANCISCO BAY AREA IN-DEPTH STUDY
ADVISORY COMMITTEE

FEDERAL AGENCIES	STATE AGENCIES	REGIONAL AGENCIES	LOCAL ORGANIZATIONS	
COL. H. A. FLERTZHEIM, JR. (CHAIRMAN) CORPS OF ENGINEERS DEPARTMENT OF DEFENSE	FRANK TORKELSON ACTING DIRECTOR DEPARTMENT OF NAVIGATION AND OCEAN DEVELOPMENT	REVAN A. S. TRANTER EXECUTIVE DIRECTOR ASSOCIATION OF BAY AREA GOVERNMENTS	ROBERT H. LANGNER EXECUTIVE DIRECTOR CALIFORNIA MARINE AFFAIRS AND NAVIGATION CONFERENCE	THOMAS T. SOULES PORT DIRECTOR PORT OF SAN FRANCISCO
CAPT. D. W. STARR, JR. COAST GUARD DEPARTMENT OF TRANSPORTATION	G. RAY ARNETT DIRECTOR DEPARTMENT OF FISH AND GAME	JAMES A. BARNES EXECUTIVE DIRECTOR SACRAMENTO REGIONAL AREA PLANNING COMMISSION	KARL E. SEEGER VICE PRESIDENT INTERNATIONAL DIVISION WELLS FARGO BANK	FRED DE PIETRO PORT MANAGER PORT OF REDWOOD CITY
THOMAS J. PATTERSON, JR. WESTERN REGION DIRECTOR MARITIME ADMINISTRATION DEPARTMENT OF COMMERCE	A. N. DUNHAM DEPUTY DIRECTOR DEPARTMENT OF TRANSPORTATION	PETER D. VERDOORN EXECUTIVE DIRECTOR CITIES AND COUNTY OF SAN JOAQUIN ADVISORY PLANNING ASSOCIATION	GEORGE M. DIXON CONSULTANT PHILLIPS PETROLEUM CO.	WALTER ABERNATHY DEPUTY EXECUTIVE DIRECTOR PORT OF OAKLAND
MS. SHELIA PRINDIVILLE DIRECTOR WATER PROGRAMS DIVISION ENVIRONMENTAL PROTECTION AGENCY	JOHN GEOGHEGAN DIRECTOR STATE DEPARTMENT OF COMMERCE	CHARLES R. ROBERTS EXECUTIVE DIRECTOR SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION	F. R. HENREKEN CONSULTANT SOLANO COUNTY INDUSTRIAL DEVELOPMENT AGENCY	THOMAS R. EDDY PORT DIRECTOR PORT OF RICHMOND
DON REESE REGIONAL SUPERVISOR U.S. FISH AND WILDLIFE SERVICE DEPARTMENT OF THE INTERIOR		PAUL C. WATT EXECUTIVE DIRECTOR METROPOLITAN TRANSPORTATION COMMISSION	DAN T. DAGGETT GENERAL MANAGER SOUTHERN PACIFIC INDUSTRIAL DEVELOPMENT CO.	GEORGE PLANT PRESIDENT BENICIA PORT TERMINAL CO.
DR. ELIZABETH TAPSCOTT DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT		JOHN PASSERELLO SPECIAL CONSULTANT CALIFORNIA COASTAL ZONE CONSERVATION COMMISSION	REDMOND KERNAN SAN FRANCISCO TOMORROW	WILLIAM T. FLEMING PORT ENGINEER PORT OF STOCKTON
GEORGE H. STONE STATE CONSERVATIONIST SOIL CONSERVATION SERVICE DEPARTMENT OF AGRICULTURE			MRS. RICHARD F. JOHNSON BAY AREA AUDUBON COUNCIL	MELVIN SHORE DIRECTOR PORT OF SACRAMENTO
			RICHARD GRYZIEC SAVE THE BAY ASSOCIATION	J. L. EVANS STATE DIRECTOR UNITED TRANSPORTATION UNION
			STAFFORD KEEGIN PEOPLE FOR OPEN SPACE	NORBERT F. MILLER SECRETARY - TREASURER WESTERN CONFERENCE OF TEAMSTERS
			THOMAS ZUCKERMAN SAVE THE DELTA ASSOCIATION	LLOYD M. MARTIN REPRESENTATIVE MARITIME TRADES PORT COUNCIL

an overall regional port development plan; the creation of the Senate Select Committee on Maritime Industry and the Assembly Select Committee on Deepwater Ports by the California Legislature to hold hearings and conduct studies with a view toward developing recommendations for legislation on navigation; the reactivation of the Northern California Ports and Terminals Bureau (NORCAL) to represent the ports in regional port planning; the formulation of the Maritime Policy Task Force by the San Francisco Bay Area Council to develop a policy position relating to regional maritime activity; and the activities of the California Marine Affairs and Navigation Conference (C-MANC) with respect to the maritime industry. These events all point to the need for regional navigation planning in the Bay Region and they reinforce the need for the In-Depth Study. The following paragraphs discuss these events in more detail.

a. Metropolitan Transportation Commission (MTC). In September 1970, the State passed Assembly Bill 363 (California Government Code: Title 7.1 (Commencing with Section 66500)), creating the Metropolitan Transportation Commission with jurisdiction over the nine counties bordering San Francisco Bay. The primary function of this Commission is the review of local applications for Federal and State grants for transportation needs to ascertain compatibility of local transportation plans with the regional transportation plan. A provision of AB 363 required the Commission to submit to the legislature in January 1974 a report on the role and function of harbors within the regional transportation system as they relate to surface transportation. This report has been submitted, but deals only with the existing conditions. Findings in the report indicate that existing port activity has a significant impact on the regional surface transportation system; that past San Francisco Bay region port planning studies have devoted little effort to determining the relationship of surface transportation to marine terminal facilities; and, that extensive data collection and analysis are needed before relationships can be identified. The Corps is represented on an advisory committee to the Commission staff assigned responsibility for preparation of this report.

b. In November 1972, the State passed Assembly Bill 69 (California Government Code: Title 2 (Commencing with Section 11552, Title 7 commencing with Section 65080)), creating the Department of Transportation within the Business and Transportation Agency. The director of the Department is charged with preparation of the California Transportation Plan by January 1976. The State Plan will consist of regional plans, including, where applicable, a seaport element. The agency responsible for preparation of the regional transportation plan for the San Francisco Bay Region is the Metropolitan Transportation Commission. Review of the plans is provided for annually for two successive years following submittal of the regional plans in April 1975, and at two-year intervals thereafter.

c. San Francisco Bay Conservation and Development Commission (BCDC). This Commission, created by the State Legislature in 1964, is responsible for regulating development along the shorelines of San

Francisco Bay. In the area of navigation development it is particularly concerned with permit applications for the filling of the Bay for maritime facilities. In 1969, the Commission published the San Francisco Bay Plan against which all development applications are evaluated. Among the policies relating to port planning and development are the following: (1) Future port planning and development -- but not necessarily port operation -- should be guided by an overall regional port development plan, and (2) some filling and dredging will be required to provide for necessary port expansion, but any permitted fill or dredging should be in accord with an overall regional port development plan. In June 1973, the executive director, on the direction of the Commission, wrote to all the port directors in the Bay Region to convey the Commission's concern "that potential competition among ports can easily lead to piecemeal, uncoordinated development plans for individual ports that will create pressures for unnecessary Bay fill." The letter went on to say that "although it may not be Commission's role to develop a specific, comprehensive, regional plan for port development, the Commission does have the statutory obligation to keep Bay fill to the minimum necessary," and that "the need now is for those concerned with port development to prepare a more specific plan that provides for the orderly development of Bay Area ports on a regional basis in a manner consistent with the Bay Plan." The Bay Plan Evaluation Report, which was completed in September 1974, is a first step towards revision of the Bay Plan. The recommendations presented in the report are in essence a basic outline of the proposed Bay Plan revision program. If the Commission approves the general outline then the BCDC staff will prepare and submit a detailed work program to carry out the revision effort. Included in the report is a recommendation that economic and environmental studies of ports and possible port expansion be undertaken as part of BCDC's participation in the development of a regional port plan. It is expected that the completion date for the Bay Plan revision may coincide or lag the completion date for the In-Depth Study. Therefore, the In-Depth study data will be useful to BCDC in its effort to revise the Bay Plan.

d. Senate Select Committee on Maritime Industry. This Committee, created by the State Legislature in 1973, and chaired by Senator Milton Marks, has a broad mandate to investigate all aspects of navigation in California. Its effort, however, is oriented toward promoting economic development related to the maritime industry. Several hearings have been held and more are scheduled on the condition of port, shipyard and support facilities. The Committee has drafted legislation to establish a \$100 million State revolving fund to finance maritime development. Another outgrowth of the Committee's work is S.B.2418 designating the San Francisco Bay Conservation and Development Commission as the lead State agency for coordination and simplification of permit review procedures for dredging applications among State and regional review agencies.

e. Assembly Select Committee on Deepwater Ports. This Committee was appointed by the Speaker of the Assembly in 1973 and is chaired by Assemblyman Mike Cullen. Unlike the general mandate of the Senate Committee, this Assembly Committee is charged specifically with addressing and reporting upon public issues related to deepwater ports along the coast of California. Areas investigated included: an evaluation of the economic and environmental impacts of deepwater ports; recommendations concerning the appropriate State role in locating deepwater ports and related facilities; determination of whether the State should establish new criteria for siting of pipelines and/or minimum standards for fuel carrying ships in State waters; and determination of whether deepwater ports should be privately or publicly financed; and, whether deepwater ports should be multi-use facilities. Several hearings have been held and more are planned. The Committee submitted a report to the Speaker of the Assembly August 31, 1974.

f. Northern California Ports and Terminals Bureau (NORCAL). Membership of this organization, established in 1952 for rate-making purposes, consists of all public ports and some private terminals inside the Golden Gate. It has been inactive since 1968 when most of the membership joined the California Association of Port Authorities. However, the organization was recently reactivated, largely due to actions stated in paragraphs 12a and 12b, to both participate in regional port planning and to develop their own plans for regional facilities. The U.S. Maritime Administration is sharing the cost of a NORCAL research effort to this end. Close coordination between the In-Depth Study and the NORCAL study will be required to minimize potential overlaps in study efforts.

g. San Francisco Bay Area Council. The council was formed in 1945 to articulate the viewpoint of business on the economic, environmental, social and governmental issues of the Bay Region. Its membership consists primarily of key business leaders in the nine-county San Francisco Bay Region. During the period 1958-1961, the Council, as a result of study findings, proposed a Golden Gate Authority to coordinate and manage the seaports, airports and bridges of the Bay Region. This proposal resulted in the creation of the Golden Gate Authority Commission by the State Legislature and further studies were made. The Commission recommended the establishment of a Golden Gate Authority to the Legislature, but legislation was never enacted. More recently, in October 1973, the Council announced the formation of the Bay Area Maritime Development Policy Task Force to prepare a proposed Council policy position on the relative importance of maritime and port activities in the Bay Region and to

make recommendations on how that activity might be optimized. The Task Force includes members from government, business, industry, ports and labor. The District Engineer is a member of this Task Force. The work of the Task Force culminated in a report which was published in July 1974. It set forth general policies which the council believes must be implemented to strengthen the Bay Area's maritime economy.

h. California Marine Affairs and Navigation Conference (C-MANC). C-MANC is a private association which provides a continuing forum and coordinated legislative representation for ports, public bodies and others interested in navigation improvements. The Marine Exchange, which is C-MANC's predecessor (and is still in existence as a separate organization), was formed in 1956 at a time when there was lack of coordination among the ports of the region in securing Federal funds for civil works. The effort continued as a Bay Region operation until it gradually expanded to include all the ports of Northern California. At the request of the State of California and California Congressional representatives, a similar organization was subsequently formed in Southern California. These two organizations worked together closely and merged in 1971, becoming the California Marine Affairs and Navigation Conference. Presently there are about 100 members comprising all elements of the marine industry including the ports of the San Francisco Bay Area. C-MANC sponsored and supported the Corps of Engineers' Comprehensive San Francisco Bay Survey and the Bay Model. C-MANC was instrumental in initiating the In-Depth Study by contributing to its conception and engendering support of the Study by the California Congressional delegation.

13. In summary, the reasons for revising the Plan of Study are two-fold: lack of adequate funding to pursue the scope of study as originally planned; and a need to restructure the scope of study to accommodate changing maritime planning requirements at the local levels.

14. Although the Metropolitan Transportation Commission is scheduled to complete a regional navigation plan by April 1975, this effort has just been initiated subsequent to their report to the Legislature on surface transportation access to seaports, which was completed in January 1974. In effect, the Commission will have just one year to complete a regional navigation plan for the Bay Region. District participation as a member of the Commission's Seaport Technical Advisory Committee and their Regional Seaport Policy Committee so far has resulted in the conclusion that the MTC regional navigation plan will consist only of policy statements and will lack detailed supporting

data except for those made available to date from the In-Depth Study. It is not expected that this plan would be sufficient to define the Federal navigation interest or fulfill the requirements of the Congressional resolution authorizing the In-Depth Study. Therefore, the In-Depth Study, to be completed three years after the MTC plan, is still considered necessary, and will serve as a basis for the review and updating of that plan as called for by the State law (AB 69). The MTC effort will make maximum use of available In-Depth Study data.

15. With regard to the planning effort of the Northern California Ports and Terminals Bureau, it is worth noting that its main purpose is to develop planning data as input for influencing the MTC plan and the degree of this effort will depend on the amount of funding assistance from the Maritime Administration. As indicated in its proposal to the Maritime Administration, the NORCAL effort would consist of two phases with the Phase I efforts directed towards reviewing the In-Depth Study's waterborne commerce projections and analyzing the forecast in terms of the facilities that will be required to handle future cargoes. Phase II efforts will involve a review of the Corps of Engineers' estimate of the cargo handling capability of Bay Delta ports and then prepare a report outlining the methodology, for dissemination to the maritime industry. The Maritime Administration and NORCAL have agreed in principle on the scope of work and level of funding. The first installment of funding is to be received sometime in January 1975. The revised plan of Study, as presented herein, assumes only Corps effort and funding. However, it is flexible enough to adjust and accommodate the NORCAL and/or MTC programs and enable the complementary efforts to accelerate and broaden the scope of the study.

16. Finally, it should be pointed out that the In-Depth Study was thought necessary six years ago by the Congress when it authorized the Study for the Bay Region, and the passage of time has reinforced the need for such a study as indicated by previous paragraphs. In a navigation region such as the San Francisco Bay system where a number of ports exist and compete, the question is often asked whether a new facility or navigation channel for one port actually attracts new business from outside the region or merely takes old business from competitors within the system. The In-Depth Study is intended to define Federal interest in navigation development in the Bay Region, especially with respect to future needs for navigation channels. As mentioned previously, it is not expected that the MTC plan would provide the necessary data to define this Federal interest, particularly regarding the engineering and design aspects. Therefore, the In-Depth Study plan, as revised herein, should be carried out and completed as a basis for future decisions on Federal participation in navigation development in the Region, and to form the framework for analysis of current navigation studies specifically authorized for individual ports.

17. REVISED PLAN OF STUDY

Besides the reduced scope of work, the format of this revised Plan of Study departs in one major aspect from the Detailed Plan of Study of March 1971, i.e., the revised plan is product-oriented with respect to fund availability for each fiscal year. In other words, the revised plan is structured to produce a report or reports at the completion of major studies. This approach has the advantage of producing useful reports as the study progresses and is especially significant in view of the current State and local interests in regional navigation planning. In fact, both MTC and the Northern California Ports and Terminals Bureau have indicated they would utilize the commodity flow and facilities inventory data of the In-Depth Study rather than develop their own independently.

18. Another significant departure is the participatory manner under which the study would be conducted. The Detailed Plan of Study called for a joint Federal interagency effort while the revised plan, due to current and expected low funding levels, is based on in-house Corps of Engineers effort and the use of consultant services where appropriate.

19. The revised study is estimated to cost \$650,000 in addition to previous allocations of \$700,000 through FY 1975 as noted previously. The revised study effort will be conducted over a four-year period, FY 1975 through FY 1978. Much of the study data developed prior to FY 1975 are applicable to the revised plan and they have been incorporated into the revised study plan to the fullest extent practicable. Examples of useable data are those compiled on historical commodity movement and port facilities inventory.

20. OBJECTIVE

The objective of the study remains generally the same as outlined in the Detailed Plan of Study, i.e., the objective is to prepare guidelines for alternative regional navigation plans to accommodate waterborne commerce in the San Francisco Bay Region within the context of needs for environmental protection and enhancement and general community well-being. The output of the study will be a series of navigation development alternatives for different levels of commerce, together with their physical, environmental and social implications.

21. The guidelines for alternative regional navigation plans will be presented in a manner that could be translated into specific programs or projects.

22. The study will specifically address the two national objectives of National Economic Development (NED) and Environmental Quality (EQ) as set forth in the "Principles and Standards for Planning Water and Related Land Resources," published by the Water Resources Council on September 10, 1973 (38 Federal Register 174).

a. NED is to be achieved by increasing the value of the Nation's output of goods and services and improving national economic efficiency.

b. EQ is to be achieved by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems.

23. The development of alternative regional navigation plans will not preclude or defer for future action the execution or completion of already authorized projects or projects under study that are needed to meet current requirements and that would be elements of any plan for future development. Thus, the orderly and continued development of the harbor system can proceed simultaneously with the study.

24. SCOPE OF STUDY

The scope of this revised plan of study differs from the Detailed Plan of Study in two major areas: (a) a several-fold reduction in study cost estimate requires that the scope of investigation of some study elements originally conceived would have to be greatly reduced; and (b) reduced funding requires that the study be conducted as an in-house Corps of Engineer effort instead of a Federal interagency effort as originally planned and partially carried out. It is expected that consultant services would be used in areas where in-house expertise is not available.

25. The scope of the In-depth Study will be a multi-discipline study encompassing the engineering, economic, physical, biological, and social sciences. The approach to be used in formulating the study elements to fulfill the objectives is to: (1) determine the present and potential relationship to other West Coast ports, (2) analyze the intra-port facilities of the San Francisco Bay Region as a port system, and (3) analyze the potential of the San Francisco Bay System for new ports and other terminal facilities as supplements to the existing port system. Findings of the West Coast Deep Water Port Facilities Study will be incorporated in the final report.

26. The comprehensive and multi-discipline nature of the study indicates that the formulation and selection of alternative port systems should be implemented within the framework of the "Principles and Standards for Planning Water and Related Land Resources," published by the Water Resources Council on September 10, 1973 (38 Federal Register 174).

27. The selection of alternatives also will consider the legal and institutional aspects relating to waterborne commerce and associated activities.

28. The subject of the study elements to define the study objective remains essentially the same as in the Detailed Plan of Study. However, the scope of the study elements has been greatly reduced with some of the study elements altered from independent and comprehensive analyses to "assessment" studies. These "assessment" studies include: Transportation Systems, Environmental, Socio-economics and National Defense. The Environmental Assessment element, however, will be supplemented by an independent on-going Dredge Disposal Study for the Bay Region, budgeted at \$2.5 million and scheduled for completion prior to the In-Depth Study. The study elements, as shown in Exhibit 1, are as follows:

- a. Commodity Flow Analysis.
- b. Vessels and Port Facilities Analysis.
- c. Transportation Systems Assessment.
- d. Environmental Assessment.
- e. Socio-Economic Assessment.
- f. National Defense Assessment.
- g. Legal and Institutional Considerations.

29. The distinction between "analysis" and "assessment" as used herein refers to breadth of coverage. "Analysis" refers to an independent investigation that is complete in itself while "assessment" refers to supportive and dependent studies. For instance, although the scope of the Commodity Flow Analysis has been reduced, the end product remains the same, that is, a set of commodity flow projections developed independently of other study elements. On the other hand, the Transportation Systems Assessment, as defined herein, refers to the assessment of the adequacy of the land-side transportation networks to handle the commodity flow that would be generated by a particular regional navigation alternative. Hence, the Transportation Systems Assessment is supportive of other study elements.

30. Contrary to the short-term (1980 to 1985), mid-term (1995 to 2005) and long-term (2020 to 2040) study time periods of the Detailed Plan of Study, this revised study plan will be based on the three time periods, from the present to 1980 (short-term), 1980 to 2000 (mid-term), and long-term (2000 to 2020). The revised time periods have been adopted so that the data can be used for specific project studies such as Richmond Harbor and Oakland Outer Harbor.

31. AREA OF INVESTIGATION

The nature of the In-Depth Study is such that certain aspects of the study will cover a world-wide area. For instance, the Commodity Flow Analysis will consist of origin and destination studies tracing the existing and future movements of commodities from the various ports of the world to the Pacific Basin, the United States, the West Coast and the San Francisco Bay Region and vice versa. Conversely, the common investigation area for all study analyses, also the region of primary emphasis, is the San Francisco Bay Region counties of: Marin, Sonoma, Napa, Solano, Yolo, Sacramento, San Joaquin, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco. This primary region is shown in Plate 1. For study effectiveness, the regions of influence have been defined by function as follows:

a. Commodity Flow Region. As stated previously, the Commodity Flow Analysis will cover a world-wide area. However, the degree of detail on international trade data will be on a highly aggregate basis. Commodity flow data of greater detail, in increasing order, will be developed for the Pacific Basin, United States, West Coast, and finally, greatest details will be emphasized for commodity flow into, through, and out of the San Francisco Bay Region.

b. Vessels and Port Facilities Region. In addition to the San Francisco Bay Region ports, this study region includes all major West Coast port facilities, existing and planned, such as those at Seattle, Portland, Humboldt Bay, Los Angeles-Long Beach, and San Diego. The other major West Coast ports will be analyzed for their influence on Bay Region ports. Coordination will be required with the Corps of Engineers Districts within the Vessels and Port Facilities Region to gather the information necessary to evaluate the competitive nature of the Pacific Coast shipping industry.

c. Transportation Systems Region. This study region has been defined on the basis of major transportation systems feeding into the Bay Region. It includes parts of the States of Washington, Idaho, Wyoming, Colorado, Nevada, and California, and the states of Oregon and Utah as shown on Plate 2. The focus of the Transportation Systems Analysis, however, will be on the San Francisco Bay Region in connection with the movement of cargoes in and out of the Bay port complex.

d. Social Well-Being Region. This study region includes the San Francisco Bay Region and the Central Valley as shown on Plate 3. The Central Valley is included in this study region primarily because of the potential effect of its land use patterns on the economy of the Bay Area.

e. Environmental Region. The environmental study region includes the San Francisco Bay Region and potential adjacent coastal deepwater harbor sites.

f. National Defense Region. The study region for the National Defense Analysis is the entire United States with primary emphasis on the role of the San Francisco Bay port system.

32. STUDY PROCEDURES

Under this revised study plan, maximum use of data developed to date will be made to continue the study at a reduced scope. Study elements and sub-elements are structured such that usable reports will be produced at the completion of major studies. The sequence of events presented herein generally follow those delineated on the Logical Sequence Network, Exhibit 1, and include the following major study items: Major study elements; new facility analysis; formulation of alternative port systems; selection of alternative port systems; technical reports; and guidelines for navigation facility planning. The specific study steps are discussed in the following paragraphs:

a. Major Study Elements. In order to fulfill the study objective, studies as listed under Scope of Study will be conducted to serve as basis for the formulation and selection of alternative port systems, and the ultimate output of navigation facility planning guidelines. Details of these study elements are given later in this report.

b. New Facility Analysis. A new facility analysis is to be completed at the end of FY 75 and will be based on studies accomplished to that date. These studies include the commodity flow projections, inventory of existing navigation and port facilities, evaluation of existing facility capability and analysis of future facility requirements to accommodate projected commodity movements. This study element will recognize that vessels calling in the Bay are not necessarily fully loaded or unloaded at a single berth call and will reflect the distribution of cargo between public, preferential and private berthing. However, it does not consider any of the physical and environmental constraints to cargo movement. For example, if a deeper channel is required to accommodate projected cargo movement to a specific facility, it will be assumed, at this point of the planning process, that this channel can be deepened even though it may later be proven engineeringly impractical and environmentally undesirable. Subsequent impact assessment studies will provide the basis for evaluating and selecting alternative port systems including consideration of engineering and environmental feasibilities.

c. Formulation of Alternative Port Systems. Building on the new facility analysis, this phase of the study, to be completed in FY 1976, will consist of identification of alternative port systems. Preliminary conceptual designs and cost estimates will be made for each alternative port system. Assessment studies will have been initiated but not completed until the following fiscal year. Data from the Dredge Disposal Study will be available at this time.

d. Selection of Alternative Port Systems. Evaluation and selection of the alternative port systems will be accomplished prior to completion of the study by the end of FY 1978. Final systems design and cost estimates and all of the assessment studies will have been completed prior to the selection process to identify alternative port systems for the Bay Region.

e. Guidelines for Navigation Facility Planning. The output of the study will be a series of guidelines or policy statements reflecting the findings of the selected alternative port systems. The final report presenting the guidelines will not recommend any single navigation plan for the San Francisco Bay Region, but rather it will present alternative port systems to meet given levels of waterborne commerce, considering the regional port complex as a single navigation system. Guidelines for each alternative will be presented in sufficient detail so that they may be easily translated into an action program.

33. As previously discussed, the study will specifically address the two national objectives of National Economic Development (NED) and Environmental Quality (EQ), as set forth in the Water Resources Council's "Principles and Standards." As such, the final report will present NED and EQ port systems alternatives.

34. STUDY ELEMENTS

In the conduct of all investigations, maximum use will be made of existing information and studies underway by the Corps and other Federal and non-Federal agencies. Work will be limited to the amount and degree of refinement needed to reach the objective of the study. Study elements to be analyzed are presented in the following paragraphs.

35. COMMODITY FLOW ANALYSIS

This analysis is undertaken to provide a range of potential future waterborne commerce by commodity groups. This is largely an independent study and requires only limited interaction with other study elements. The projections of the flow of commodities will provide the basic data for evaluation by all other studies.

a. Scope. The study will consider current and future cargo movements between ports on the West Coast and international trading partners with emphasis on the flow of commodities within the Pacific Basin. Inter-coastal commodity movements and movements between West Coast ports that are classified as domestic or coast-wise shipments will be considered along with imports and exports. Commodity movements that are initiated and terminated within the San Francisco Bay and its tributaries are classified as internal trade and will be considered in general terms, but will not be analyzed in as great detail as the international and inter-coastal movements. The study will concentrate on the San Francisco Bay Area port systems, including Delta ports. Other West Coast ports will be considered and the analysis will deal with them as regional port systems. The regional port systems will be structured as follows:

- (1) Pacific Northwest Port System.
- (2). Northern California Port System.
- (3) Southern California Port System.
- (4) Hawaii Port System.

b. Methodology. The range of projections will be based on the full spectrum of reasonable judgments about the future of U.S. foreign trade and domestic inter-regional shipments. The high projection will follow optimistic assumptions on future foreign trade opportunities and on the effect of domestic growth in population and purchasing power. For example, recently concluded trade agreements with the U.S.S.R. and the People's Republic of China will be analyzed for future trade implications. The intermediate projection will be based on average assumptions about the climate for future foreign trade and domestic shipping. The low projection will be based on conservative judgment about these factors and about the activity of Bay Area ports vis-a-vis other ports on the West Coast.

36. The judgments or assumptions of future U.S. foreign trade and domestic waterborne commerce will incorporate explicit consideration of such factors as balance of payments, foreign aid policy, monetary affairs, agricultural production, urban growth, regional differences in economic growth, regional economic specialization, and regional transportation infra-structure of other West Coast ports.

37. The analysis of future foreign trade and commodity movements will take place at three levels of detail. Trade and commodity flows on a worldwide scale will be considered first with emphasis on the Pacific Basin. Next, the West Coast of the United States will be considered in the context of Pacific Basin trade. Individual attention will be given to current major U.S. trading partners in the

Pacific Basin, such as Japan and Australia. U.S.S.R. and Mainland China will be considered in detail as new and potential major U.S. trading partners. The third and final level of analysis will be an examination of the San Francisco Bay Area port system and its participation in West Coast and Pacific Basin trade.

38. The analysis will involve an examination of historical trends in San Francisco Bay area and West Coast shipping. The report on Historical Commodity Movement has been completed as previously indicated. The key variables associated with those trends will be analyzed using multiple-regression techniques. The results of that analysis of variables will be modified by conclusions drawn about hypothetical future conditions, as well as conditions that have come about in the past one or two years.

39. Because of the rapidly changing character of shipping in the Bay Area and the world, there will be less emphasis on historical trends than on the analysis of the variables that explain those trends and the analysis of current and future exogenous variables.

40. Thus, the results of this three-part process will be projections based to some extent on past experience modified to a greater extent by the effect of a detailed analysis of determinants of those trends (particularly those determinants of change in the trends) and modified again by judgments about current and anticipated changes in the foreign trade climate, and in the conditions for domestic waterborne commerce.

a. Results of Analysis. The study will produce high, low, and intermediate projections of waterborne (a) exports plus coastwise shipments and (b) imports plus coastwise receipts for the four regional port systems. The projections will be expressed in tons for the regional port systems. The projections will not differentiate between ports within the regional systems except for the Northern California projection where those ports outside the San Francisco Bay and its tributaries will be stripped out and presented separately. The projections will be for the years 1980, 2000 and 2020.

41. The projections will be presented by commodity categories for the Bay Area port system and in aggregate tonnages for all other groups of ports. The structure, or composition, of the categories will be based on several factors. Commodities which have similar demand/supply characteristics and thereby lend themselves to common projection techniques will be aggregated generally by category. Commodities that clearly will be shipped by distinct modes of movement, however, will be grouped in separate categories even though their demand/supply characteristics are common.

42. In addition to the aforementioned two ways of grouping commodity projections, the study will present individual projections of commodities likely to increase dramatically in volume. All commodities will be considered except liquefied natural gas, which will be deferred for later consideration, and crude petroleum.

43. After making projections by commodity categories for the Bay Area port system, future tonnages will be allocated to mode of waterborne movement. Categories or commodities which move largely by one mode (e.g., grains which are shipped mainly in bulk carriers) will be assigned to the appropriate mode. Categories of commodities which historically have been shipped by more than one mode will be allocated to the modes after consideration of a number of economic and physical factors. The factors will include the cost per ton-mile, the historical modal distribution of commodity categories, recent trends in modal distribution of commodities, and shippers' commitments to future fleet composition. The modes of movement will be grouped in categories according to the commonality of their port facility requirements. The categories of modes of waterborne movement that will be considered are as follows:

- a. Containerized (including container ships and LASH ships).
- b. General cargo (including break bulk ships, Ro-Ro ships, neo-bulk ships and barges).
- c. Dry bulk ships.
- d. Liquid-bulk ships (excluding crude carriers).

44. Projections for the regional port systems other than the Northern California Regional port system will not be presented in as great detail as referred to above. Only total tonnages in broad commodity categories will be presented for the other three regional port systems.

45. The In-Depth Study's commodity flow analysis represents an integrated step of a larger effort. The Corps' three Pacific Divisions are conducting a joint study of commodity flows between the West Coast of the United States and the Pacific Basin. The Pacific Basin Study will analyze origins and destinations of waterborne commerce. This information will be used to firm-up the commodity flow data of the In-Depth Study. Long-term projections in a competitive framework will be made for major port systems on the West Coast, including Puget Sound, the Columbia River, the San Francisco Bay Area, Southern California and Hawaiian ports. The final report for the Pacific Basin Study is scheduled for December 1975.

46. VESSELS AND PORT FACILITIES ANALYSIS

This analysis will be undertaken to provide design and cost estimates of navigation development for use during the formulation and selection of alternatives. It will include study elements concerning existing and potential navigation channels, and port facilities and vessel trends.

a. Inventory of Existing Navigation and Port Facilities.

This study element, completed in June 1973, inventoried all navigation, port and related facilities in the Bay Region, including the Delta ports. Inventoried items included channels, berths, storage areas, equipment, surface transportation access, bridges and pipelines.

b. Existing Port Facility Capabilities. Having obtained the physical dimensions of the existing port facilities, this study element will determine their optimum throughput capabilities taking into account the types of berth (exclusive, preferential or public), method of operation (e.g., container stacking), equipment capacity, frequency of vessel arrival, and surface transportation link. General criteria will be developed based on the aforementioned factors and applied to the same facility types as it would be impractical to individually determine the optimum throughput capability of the numerous different facilities in the Region.

c. Integration of Cargo Projection and Facility Capability.

This study element will analyze projected commodity flow movements and integrate these commodity data with the throughput capability of the existing and planned facilities to determine whether there is a need for new facilities to accommodate projected future waterborne commerce movements. An overage or shortage of facilities will be expressed by the major cargo groups discussed previously, i.e., containers, breakbulks, etc.

d. New Facilities Analysis. This study element will examine potential vessel trends, navigation channels and port facilities to accommodate future waterborne commerce of the Bay Region. It will provide the basic data for the development of alternative port systems.

(1) Vessel trends. World and U.S. vessel statistics for 1970 have been compiled in a previously noted report. Similar data for other years are and will be available from regular U.S. Maritime Administration reports. Current vessel traffic in and out of the Bay Region, and to a less extent, West Coast vessel traffic, will be compiled as a basis for forecasting future vessel sizes. Primary

data that would be acquired include whether vessel was laden or empty, draft, type of cargo, flag of registry, origin and destination, and traffic density. It is envisioned that past and current projections of vessel size changes will be correlated with recent contracts for new vessels of varying size and type categories. New projections of worldwide fleet characteristics and vessels which will be entering the Bay and the distribution of their sizes will be made.

(2) Navigation channels. An inventory of Bay Region navigation channels has been made as noted previously. To a limited extent, existing West Coast channels will be analyzed to ascertain the competitive position of Bay Area navigation facilities with other West Coast ports and to determine the extent and potential for multi-porting, i.e., vessels calling at more than one port. An engineering and related first cost and maintenance cost of navigation channels in the Bay Region will be conducted with guidance provided by the vessels and port facilities investigations. Costs and methods of dredge material disposal will be largely derived from the on-going Dredge Disposal Study. Aids-to-navigation are part of this study element.

(3) Port Facilities. New facility requirements will be determined, as previously noted, by the integration of commodity flow projections and the capability of the existing and planned facilities. The studies on vessel trends and navigation channels will aid in the evaluation of dockside facilities and operating areas. Consideration will be given to all factors associated with modernization potential, expansion potential and the potential for new ports in the Bay Region. Other West Coast port facilities will be examined to a limited extent for their potential influence on the Bay Region. Conceptual designs and cost estimates will be developed for the new facilities for each major cargo category which will become components of the alternative port systems. It is envisioned that conceptual designs will consist of standard facility modules which can be used in several plans varying only by the foundation, different site conditions and other engineering features which may be peculiar to a particular site or sites. Cost estimates will be based on unit cost curves developed for the various features to the standard facility modules. New technology, including intermodal factors, will be thoroughly considered in this study element. Mitigation and/or enhancement measures associated with the new facilities will be analyzed to meet environmental and social well-being objectives.

47. TRANSPORTATION SYSTEMS ASSESSMENT

The scope of the Transportation Systems Analysis set forth in the September 1972 Working Draft, Plan of Analysis was directed

toward determining the probable influence of future developments in waterborne commerce and port facilities on the existing and future development of the integrally related elements of the regional transportation system. Departures from the Working Draft, Plan of Analysis are primarily with respect to the depth of analysis to which the individual transportation systems will be studied. For example, the economic and physical factors that influence the design, location and capacity of the various land and air transportation systems will not be analyzed. The Transportation Systems Assessment element, as detailed in this report, will assess the adequacy of the land and air transportation systems to transship the projected cargoes from the docks to their ultimate destinations under the various alternative port systems.

48. Transportation modes to be evaluated include (1) rail, (2) highway, (3) air and (4) pipeline. It is anticipated that much of the data for the highway or trucking portion of the assessment will be available from the regional transportation study of the Metropolitan Transportation Commission as highway transportation is one of the primary emphasis of the MTC study. Data for the rail portion of the assessment will rely on information provided by the railroads. Air cargo presently accounts for only a minute percentage of the total transshipment of waterborne commerce and is not expected to appreciably increase its share within the study period. Existing data from the recent regional airport study by the Association of Bay Area Governments will probably suffice for the purpose of this assessment. Bay Region pipelines have been inventoried as noted previously. With few exceptions, future pipeline construction will probably consist of replacement of existing pipelines with larger sizes or construction of new pipelines along existing rights-of-ways.

49. In order to complete the transportation systems assessment, it will be necessary to conduct the following sub-studies:

a. Definition of Transportation Regions. Some preliminary data for this study element have been compiled recently for the In-Depth Study by the Coast Guard as indicated earlier. Additional effort will be required to finalize the hinterland of commodity movements by the different transportation modes.

b. Assessment of Transportation Modes. This assessment of the four land and air transportation modes will involve the capacity and capability of the existing and expanded facilities to accommodate required intermodal operations associated with different levels of commerce for each alternative port system. It will assess the adequacy of existing transportation and land use plans to accommodate intermodal traffic, and the success and potential of new technology in intermodal transportation. Specific elements for assessment of each modal operation will include:

(1) Assess existing transportation and land use plans to establish the adequacy of these plans to accommodate rail, highway, air and pipeline movement of cargo and supporting facilities associated with the various levels of commerce.

(2) Assess existing capacity, capability, and efficiency of the four modes for intermodal transportation of various throughput traffic associated with each alternative port system.

(3) Assess potential for expansion of modal facilities and operations necessary to increase intermodal capabilities for various levels of commodity movement in the Bay Region.

(4) Assess success and potential of new technology (mini-bridge, land bridge, unit train, etc.) in intermodal operations.

50. ENVIRONMENTAL ASSESSMENT

The environmental assessment will be in terms of the existing conditions and potential environmental implications of regional navigation development and their ultimate effect on the population. Beneficial and detrimental impacts induced by each alternative port system including intermodal operations will be assessed against the background of existing conditions. In the event of potentially detrimental developments, mitigative measures will also be studied. Emphasis will be given to the preclusion of developments which would involve the irreversible or irretrievable commitment of natural resources with adverse effects.

51. The objective of the Environmental Analysis, as described in the June 1972 Working Draft, Plan of Analysis, was to formulate principles to serve as guidelines for future developments in navigation and to evaluate navigation alternatives for compatibility with these principles. Since that time similar studies relevant to the originally proposed study have been funded and are now partially completed. The scope of this study element has been restructured to take maximum advantage of existing and on-going work in related areas to serve as a foundation for study development. Included in this category are: conceptual plans (i.e., San Francisco Bay Conservation and Development Commission studies, Metropolitan Transportation Commission studies, and Association of Bay Area Governments studies); specific plans (i.e., individual port plans): specific investigations (i.e., Dredge Disposal Study for San Francisco Bay and Estuary, and San Francisco Bay and Sacramento-San Joaquin Delta Water Quality and Waste Disposal Investigation, San Francisco Bay Delta Water Quality Control Program); and regulatory controls (i.e., Federal and State air and water quality standards, State Coastal Zone Commission standards, State Lands Commission, Corps permit procedures).

52. Of special and direct significance is the Dredge Disposal Study which is expected to provide to the In-Depth Study additional data on environmental effects of channel dredging and maintenance and dredge material disposal. The Dredge Disposal Study, scheduled for completion in 1975, is a \$2.5 million study the purpose of which is to determine the effects of dredging and material disposal on the San Francisco Bay area marine environment and to evaluate dredging and disposal procedures to mitigate possible adverse effects on and/or enhance the marine resources of the affected areas. The scope of the study includes: definition of sediment types; reaction of the sediments in the water column and on the bottom; dispersion pattern of material after disposal; the reaction of biological communities to dredging disposal operations; and the form, location and availability of the pollutants. The studies will initially identify problems associated with dredging and disposal operations. Continued studies will address these problems in terms of alternative disposal methods, improved dredging equipment and operations, and new technology.

53. The environmental assessment will assess impacts of vessel operations, facility construction, operation and maintenance of navigation facilities, including intermodal operations and facilities.

a. Impacts of Vessel Operations.

- (1) Traffic Congestion
- (2) Potential pollution by increased vessel traffic.

b. Impacts of Facility Construction.

- (1) Dredging
- (2) Terminals
- (3) Support Facilities.

c. Impacts of Facility Operation and Maintenance.

- (1) Dredging
- (2) Terminals
- (3) Support navigation facilities
- (4) Intermodal operation and facilities.

54. The environmental resources categories to be used in the assessment of the above potential impacts will include, but not be limited to flora, fauna, air quality, water quality, sport and commercial fishery, aesthetics, recreation and archeology.

55. SOCIAL WELL-BEING ASSESSMENT

Departure from the June 1972 Draft Report, Framework for Analysis is primarily the modification of that portion of the Social Well-Being Analysis that was concerned with the formulation of broad social well-being objectives, such as the identification and formulation of means of enhancing the overall social well-being of the Bay region population by considering the effect of navigation and waterborne commerce activity. The Social Well-Being Assessment will be limited to the impacts of maritime activities in terms of the existing conditions and potential social well-being implications of regional navigation development and their ultimate effect on the population. Beneficial and detrimental impacts induced by each alternative port system, including intermodal operations, will be assessed against the background of existing conditions. Emphasis will be given to the preclusion of developments which would be irreparably destructive to the social infrastructure of the region.

56. The assessment will utilize existing and on-going work in related areas to serve as a foundation for study development. Studies cited under Environmental Assessment, paragraph 51, are also relevant to this assessment, particularly the investigation on water quality and waste disposal. That investigation is the only known study in the region for which social well-being has been extensively and specifically investigated as a major study element. It is anticipated that methodology and social well-being parameters established in that study will be largely applicable to the In-Depth Study.

57. The most significant social well-being impact, and the one most easily quantifiable is the economic activities that would be generated by increased waterborne commerce in terms of employment, income and revenue to the region. An economic impact study will be conducted to determine the direct and indirect economic impacts of waterborne commerce to the Bay Region. Examples of direct impact are employment that would be generated by longshoremen and jobs that are directly associated with port operations. Examples of indirect impact are employment in fields supportive of port operations such as financial institutions, and ship supply and repair industries. The initial effort will be to identify the existing impacts, and subsequently a methodology will be developed to assess future economic impacts of alternative port systems associated with

projected waterborne commerce. In the development of the methodology for assessing future economic impacts of waterborne commerce, reviews will be made of existing economic projections on population and other economic indicators that are available from the various sources. New projections of general economic indicators will not be made for the In-Depth Study as existing data are considered sufficient for the purpose of this study.

58. The social well-being assessment will assess impacts of vessel operations, facility construction, operation and maintenance of navigation facilities and intermodal facilities.

a. Impact of Vessel Operations.

- (1) Economics
- (2) General Welfare
- (3) Quality of Physical Environment.

b. Impacts of Facility Construction.

- (1) Economics
- (2) General Welfare
- (3) Quality of Physical Environment.

c. Impact of Facility Operation and Maintenance (including intermodal aspects).

- (1) Economics
- (2) General Welfare
- (3) Quality of Physical Environment.

59. Where applicable, the following social well-being parameters will be used to assess the potential impacts of the above specified categories: employment, income, revenue, health, safety, convenience, dislocation, recreation and cultural activities.

60. NATIONAL DEFENSE ASSESSMENT

The objective of this assessment will be to determine the adequacy of the alternative port systems to meet national defense requirements under existing and future conditions. The assessment will concentrate on the San Francisco Bay Region with a limited overview of the national defense network, as necessary, to define the role of the Bay Region ports within the national defense scenario. The assessment will include:

a. An inventory of San Francisco Bay Region national defense facilities associated with port activities.

b. Determination of critical national defense factors and the role of the San Francisco Bay port system in respect to those national defense facilities.

c. Appraisal of present and future operational procedures and necessary capacities for port facilities in the San Francisco Bay port system in time of national crisis.

d. Assessment of the effect of national defense maritime requirements on commercial navigation facilities.

e. Assessment of anticipated problems dealing with handling and movement of hazardous cargoes within the San Francisco Bay system from the standpoint of both national defense and port safety considerations.

61. INSTITUTIONAL ASSESSMENT

This study element will consist of two parts: an inventory of the existing institutional framework relating to the planning and development of navigation facilities in the Bay Region, and a review and assessment of the existing institutional factors for their adequacy and compatibility with the alternative port systems to accommodate future waterborne commerce.

a. Inventory of Existing Institutional Framework. The inventory will identify principle local, regional, State and Federal institutions with statutory responsibilities in the field of navigation and navigation-related effects. Descriptions will include:

(1) Basic statutes and authority.

(2) Jurisdiction (territory, powers).

(3) Policy objectives, programs, plans.

(4) Organizational structure.

(5) Operational criteria (regulatory, planning, etc.)

(6) Mode of interaction with other agencies and private sector.

(7) Role in regional navigation decision-making (policy formulation, technical input, development, capital investment, regulation).

b. Assessment of Institutional Factors. The inventoried institutional factors will be reviewed and assessed for their adequacy and compatibility with the various components of the alternative port systems including channels, vessel trends, port facilities and intermodal facilities and operations.

62. ADVISORY COMMITTEE

As mentioned previously, a high level advisory committee for the In-Depth Study was established in accordance with the Detailed Plan of Study. The Committee membership was shown in Table 2. The Committee met three times in 1972 but was suspended at the end of that year pending determination of its status in conformance with Advisory Committee Act of 1972. It has been determined subsequently that this is an operational committee and is exempted from the provisions of the Act. The Committee did not meet in 1973 because much of the In-Depth Study effort was diverted to the West Coast Deepwater Port Facilities Study.

63. Because of the reduced scope of the In-Depth Study, it is anticipated that the Committee will only meet at major junctures of the Study. However, all drafts of reports when they are completed will be forwarded to the membership for review and comment.

64. PUBLIC MEETINGS

Prior to the preparation of the Detailed Plan of Study, three public meetings were held on 2, 5, and 11 June 1970 in Oakland, Martinez and Sacramento, California, respectively. At those meetings, various governmental agencies, civic groups, and individuals expressed an overall support for the study. Excerpts of statements made at these meetings were included in Appendix B of the Detailed Plan of Study.

65. General areas of interest expressed at the meetings and later correspondence involved vessel trends, channel depths, time lag between studies and plan implementation, and environmental aspects such as pollution. Other biological and conservation interests were expressed regarding obliteration of benthic communities, turbidity from dredging, and disturbance of freshwater aquifers.

66. Statements presented by several State agencies, including the Water Resources Control Board, the Department of Navigation and Ocean Development, and Department of Commerce indicated direct support for the In-Depth Study and presented detailed items regarding the State's interest in environmental as well as economic factors relating to navigation development. Also, statements presented by regional agencies, notably the Association of Bay Area Governments, expressed

support for the study and presented recommendations for studies concerning such items as oil pollution, transportation systems, employment, commodity movement and others. Statements presented by industrial interests indicated strong support for the In-Depth Study and expressed the great need for research into such areas as current and future import and export commerce, transportation requirements, and other factors relating to regional as well as national economic growth and development. Recent contacts with these agencies indicate their continued support for the Study. The California Department of Navigation and Ocean Development has placed the In-Depth Study among high priority studies it supports for Federal funding.

67. Several agencies, particularly the Ports of Oakland, Sacramento and Stockton questioned the scope of the study and the propriety of the Federal Government going beyond historical navigation studies. They suggested that investigations be primarily geared toward future developments for super-ships and their relationship to oceanborne commerce. Other areas questioned by the ports concerned the Congressional Resolution objectives which appeared to them to point toward the Federal Government dictating to local interests in such matters that are, and have been, purely local areas of concern. It was stated that matters such as improvements in harbor and industrial operations; programming; solicitation; market research; public relations; advertising and long-term planning concern port operations and should be a local rather than a Federal responsibility to plan and control. Recent events, as discussed previously, have indicated that the ports no longer object to regional navigation planning as they themselves are actively co-operating with the Metropolitan Transportation Commission in the development of the seaport element of the regional transportation plan.

68. With the exception of the Advisory Committee meetings, no public meeting has been held since the June 1970 meetings. Future meetings are planned as the study progresses as shown on the Logical Sequence Network, Exhibit 1.

69. COORDINATION WITH FEDERAL, STATE, REGIONAL AND LOCAL INTERESTS

Subsequent to the public meetings in June 1970 and prior to the completion of the Detailed Plan of Study in March 1971, numerous coordination meetings and briefings were given to interested Federal, State, regional and local agencies on the objective, scope, working procedures and study content of the In-Depth Study. Comments from these agencies were included in Appendix B of the Detailed Plan of Study. After the initiation of the Study in September 1971, much of the coordination was effected through the agency representatives on the Advisory Committee who were kept informed of study status during the quarterly Committee meetings. Under the revised study plan, the Advisory Committee will meet less frequently, but the membership will receive all completed reports for review and comment. In addition, coordination normally required for a survey report will be effected.

70. Due to the comprehensiveness of the In-Depth Study a vast array of highly specialized technical skills and knowledge is required to conduct the study. During the course of performing the various studies, a great deal of coordination effort has gone on with various governmental agencies and local organizations to take full advantage of their expertise in the areas of investigation. Included among these are the Metropolitan Transportation Commission, Maritime Administration, NORCAL, and the individual port authorities, both public and private terminal operators, in the San Francisco Bay Region. These coordination efforts are expected to continue through the completion of the In-Depth Study.

71. With the recent enactment of State Laws calling for regional navigation planning, coordination with other Federal and State agencies, and local organizations, has become increasingly important. The San Francisco District is a member of the Metropolitan Transportation Commission's Regional Seaport Policy Committee and, as such, is actively engaged in coordinating the efforts of the In-Depth Study with MTC in preparing the State Transportation Plan, which will be submitted to the State Legislature by January 1976.

72. TIME AND SEQUENCE SCHEDULE OF STUDY PROGRAM

The San Francisco Bay Area In-Depth Study is to be planned and scheduled by the use of Logical Sequence Network. The LSN, as shown in Exhibit 1, is a time-sequence flow chart which shows the logical flow path of the various study elements and the major study junctures with respect to time. It is estimated that four fiscal years will be required to complete the entire study as delineated in this revised plan, starting with FY 1975. The timing for the major items of work in the study is shown in the Milestone Schedule below:

<u>Milestone</u>	<u>Description</u>	<u>Date</u>
02	Approved Plan of Study (SPD)	28 Feb 1975
03	Submit Phase I of Study Report	14 Mar 1975
04	Checkpoint I Conference	Dec 1975
05	Formulation Stage Public Meeting	Feb 1976
06	Checkpoint II Conference	Mar 1977
07	Submit District Report Draft	Aug 1977
08	Complete Division Review of Report Draft	Sep 1977
09	Late Stage Public Meeting	Feb 1978
10	Submit District Report (SPD)	Jun 1978
11	Division Engineer's Public Notice	Jul 1978

73. ESTIMATES OF STUDY COSTS

Study cost estimates presented herein are reflective of study data generated to date and data that would be derived from on-going studies such as the Dredge Disposal Study. Total additional study costs starting with FY 1975 have been estimated to amount to \$725,000 spread over four fiscal years, FY 1975 through FY 1978. Not included in this total are the costs incurred prior to FY 1975 of \$625,000 which included \$140,000 for the preparation of the Preliminary Plan of Study and Detailed Plan of Study, and \$485,000 for initiation of study tasks as outlined in the Detailed Plan of Study among the Federal participants. Distribution of prior costs has been shown in Table 1. Study cost estimates for study elements outlined in this revised plan of study for the period FY 1975 through FY 1978 are shown in Table 3. A breakdown of the entire study by major items is shown on Form PB-6 (Exhibit 2).

TABLE 3

STUDY COST ESTIMATES
REVISED PLAN OF STUDY
SAN FRANCISCO BAY AREA IN-DEPTH STUDY
FY 1975 THROUGH 1978

Study Element	Study Cost
Economic Studies	\$ 24,000
Vessels and Port Facilities Analysis	104,000
Transportation Systems Assessment	96,000
Environmental Assessment	96,000
Socio-Economic Assessment	96,000
National Defense Assessment	16,000
Institutional Assessment	15,000
Report Preparation	117,000
Supervision and Administration	161,000
Total	\$725,000 <u>1/</u>

1/ Includes \$75,000 in the FY 75 budget.

74. SUMMARY

The San Francisco Area In-Depth Study was conceived and authorized as a comprehensive, multi-discipline and multi-agency regional navigation study to determine the Federal interest in, and provide

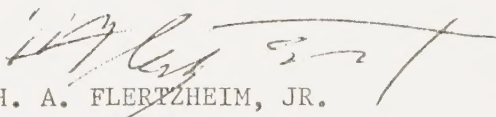
guidelines for, navigation development of the Bay-Delta port complex. The study was to be conducted over a five-year period, FY 1972 through FY 1976, and at an estimated study cost of \$4.5 million of which the Corps of Engineers work effort would total \$2.05 million and other participating Federal agencies, \$2.45 million. To accomplish the study objective would require an average funding of about \$1.0 million per year for the study period. However, actual study fundings in the years following the approval of the Detailed Plan of Study were far below the required funding levels previously anticipated. Recognizing the need for the study still exists, it was decided that the study scope should be reduced to a level compatible with expected funding levels to accomplish as much as possible the original objective of the study. Consequently, the three Federal Interagency participants which received study funding in FY 1972 and FY 1973 and other participants were notified during FY 1973 that the Plan of Study would be revised and henceforth, beginning with FY 1974, the In-Depth Study would become an in-house Corps of Engineers effort with study coordination with other agencies as required normally on the level of survey reports.

75. On the Federal level, the need for the In-Depth Study becomes even more critical today than when the study was first authorized in view of increasing competition for Federal investment in public works and the need to define navigation development from the perspective of regional needs, economic, environmental and social considerations. The question is often asked whether navigation development at one port actually attracts new shipping business to the region or merely entices the same old business from competing ports within the same port complex. Another question is whether it would be advantageous to centralize or consolidate navigation and port facilities by cargo handling types such as container, LASH, dry bulk and liquid bulk facilities. This question is particularly pertinent for the Bay-Delta port complex which contains seven ports and many private terminals. Some ports are obviously better able to handle certain types of cargo than others due to a variety of reasons such as geographic location, available transportation links, and suitable boundary areas. The In-Depth Study is designed to answer these important questions and others. In recognition of the need to evaluate navigation projects from a broader context, the San Francisco District, Corps of Engineers, has adopted the policy of analyzing authorized navigation studies for individual ports for their roles within Bay-Delta port complex. Findings of the In-Depth Study will provide the regional framework against which individual navigation projects will be evaluated. Individually authorized survey reports which depend on findings of the In-Depth Study include Oakland Outer Harbor, Richmond Harbor, Redwood City Harbor, and the Sacramento River Deepwater Channel.

76. On the State and local levels, the need for regional analysis of navigation development is also recognized as evidenced by a State Law (AB 69) passed in November 1972 which mandates the preparation of a State-wide transportation plan by January 1976. Water-borne transportation will be an element of this plan. The Metropolitan Transportation Commission (MTC) has been designated the responsible agency for preparation of the regional plan for the San Francisco Bay Region. The Northern California Ports and Terminals Bureau (NORCAL), consisting of all the public ports and some private terminals, is also active in the development of a regional port plan, their effort being primarily to provide input to the MTC plan formulation. NORCAL has recently received approval of an application for a U.S. Maritime Administration study grant (amount not yet known) to initiate its planning effort. Both MTC and NORCAL will have a short time to complete their studies to meet legislative requirements. Because of the short time available, it is expected the MTC plan will be preliminary in nature and will consist only of policy statements, lacking in engineering details to sufficiently define the Federal interest in navigation development, particularly in the area of navigation channels. Therefore, it is in the Federal interest to continue and complete the In-Depth Study as revised herein. The State-wide transportation plan will be reviewed annually for two years after adoption and biennially thereafter. Therefore, the completed In-Depth Study will provide an important basis for the second annual review. Both MTC and NORCAL have indicated they will make maximum use of the data developed to date by the In-Depth Study. The NORCAL scope of work indicates follow-up studies following their Phase I input to the MTC plan. Effort has been initiated to coordinate closely with both MTC and NORCAL to minimize potential overlaps in work efforts, particularly in their follow-up phases.

77. RECOMMENDATION

It is recommended that the revised Plan of Study, presented herein, be approved as a guide to the scheduled studies.


H. A. FLERTZHEIM, JR.
Colonel, CE
District Engineer



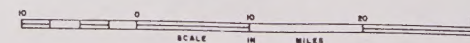
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